## **CLAIMS**

| 1  | 1-29. (canceled)  |
|----|---|
| 1  | 30. (new) A method for processing signals in a transmission system having a transmitter                   |
| 2  | subsystem connected to a receiver subsystem by an electrical backplane, wherein the electrical backplane  |
| 3  | receives a transmitted data signal from the transmitter subsystem and provides a received data signal to  |
| 4  | the receiver subsystem, the method comprising:  |
| 5  | in the transmitter subsystem:   |
| 6  | providing a final binary data signal; and   |
| 7  | processing the final binary data signal to provide the transmitted data signal to the                     |
| 8  | electrical backplane; and   |
| 9  | in the receiver subsystem:  |
| 10 | receiving the received data signal from the electrical backplane; and                                     |
| 11 | processing the received data signal as a duobinary data signal, wherein:                                  |
| 12 | the transmission system comprises at least one filter located in at least one of the                      |
| 13 | transmitter subsystem and the receiver subsystem;   |
| 14 | the transfer function property of the combination of the electrical backplane and                         |
| 15 | the at least one filter corresponds to the transfer function property of a binary-to-duobinary converter; |
| 16 | and   |
| 17 | after providing the final binary data signal, no duobinary data signal exists in the                      |
| 18 | transmitter subsystem.  |
| 1  | 31. (new) The invention of claim 30, wherein the final binary data signal is a precoded                   |
| 2  | binary data signal.   |
| 1  | 32. (new) The invention of claim 30, further comprising filtering using the at least one filter           |
| 2  | after providing the final binary data signal and prior to processing the received data signal as the      |
| 3  | duobinary data signal.  |
| 1  | 33. (new) The invention of claim 32, wherein:   |
| 2  | the at least one filter is located in the transmitter subsystem; and                                      |
| 3  | in the transmitter subsystem, the processing comprises filtering the final binary data signal using       |
| 4  | the at least one filter.  |

| 1 | 34. (new) The invention of claim 32, wherein the filtering comprises equalizing filtering.         |
|---|--|
| 1 | 35. (new) The invention of claim 32, wherein the filtering is designed to emphasize high-          |
| 2 | frequency components and flatten group delay of the electrical backplane.                          |
| 1 | 36. (new) The invention of claim 32, wherein the filtering is implemented using an FIR             |
| 2 | filter.  |
| 1 | 37. (new) The invention of claim 32, wherein the filtering:  |
| 2 | delays a first copy of the filtered data signal;   |
| 3 | attenuates the delayed first copy; and   |
| 4 | adds the attenuated, delayed first copy to a second copy of the filtered data signal.              |
| 1 | 38. (new) The invention of claim 32, wherein the combination of the filtering and the              |
| 2 | transmission through the electrical backplane approximates binary-to-duobinary conversion.         |
| 1 | 39. (new) The invention of claim 30, wherein duobinary-to-binary (D/B) conversion is               |
| 2 | applied to the received data signal to generate an output binary data signal.                      |
| 1 | 40. (new) The invention of claim 39, wherein the D/B conversion comprises:                         |
| 2 | comparing amplitude of the received data signal with first and second threshold voltages to        |
| 3 | generate first and second binary streams; and  |
| 4 | applying a logic function to the first and second binary streams to generate the output binary dat |
| 5 | signal.  |
| 1 | 41. (new) The invention of claim 40, wherein the logic function comprises an exclusive-OF          |
| 2 | (XOR) function.  |
| 1 | 42. (new) The invention of claim 40, wherein the logic function comprises an                       |
| 2 | exclusive-NOR (XNOR) function.   |
| 1 | 43. (new) The invention of claim 40, wherein:  |
| 2 | the output binary data signal is an NRZ binary data signal; and                                    |

Serial No. 10/727,450 -3- Adamiecki 3-7 (990.0517)

| 3  | the first and second threshold voltages are selected such that one of the first and second binary         |
|----|---|
| 4  | streams is always zero or always one.   |
| 1  | 44. (new) The invention of claim 30, wherein the electrical backplane comprises a multi-                  |
| 2  | layer board.  |
| 1  | 45. (new) The invention of claim 30, wherein:   |
| 2  | the final binary data signal is a precoded binary data signal;  |
| 3  | filtering is performed using the at least one filter after providing the final binary data signal and     |
| 4  | prior to processing the received data signal as the duobinary data signal; and                            |
| 5  | duobinary-to-binary (D/B) conversion is applied to the received data signal to generate an output         |
| 6  | binary data signal.   |
| 1  | 46. (new) The invention of claim 45, wherein:   |
| 2  | the combination of the filtering and the transmission through the electrical backplane                    |
| 3  | approximates binary-to-duobinary conversion; and  |
| 4  | the duobinary-to-binary conversion comprises:   |
| 5  | comparing amplitude of the received data signal with first and second threshold voltages                  |
| 6  | to generate first and second binary streams; and  |
| 7  | applying a logic function to the first and second binary streams to generate the output                   |
| 8  | binary data signal.   |
| 1  | 47. (new) A transmission system comprising:   |
| 2  | a transmitter subsystem; and  |
| 3  | a receiver subsystem connected to the transmitter subsystem by an electrical backplane, wherein           |
| 4  | the electrical backplane receives a transmitted data signal from the transmitter subsystem and provides a |
| 5  | received data signal to the receiver subsystem, wherein:  |
| 6  | the transmitter subsystem is adapted to:  |
| 7  | provide a final binary data signal; and   |
| 8  | process the final binary data signal to provide the transmitted data signal to the electrical             |
| 9  | backplane; and  |
| 10 | the receiver subsystem is adapted to:   |
| 11 | receive the received data signal from the electrical backplane; and                                       |
| 12 | process the received data signal as a duobinary data signal, wherein:                                     |

Serial No. 10/727,450 -4- Adamiecki 3-7 (990.0517)

| 13 | the transmission system comprises at least one filter located in at least one of the                        |
|----|---|
| 14 | transmitter subsystem and the receiver subsystem;   |
| 15 | the transfer function property of the combination of the electrical backplane and                           |
| 16 | the at least one filter corresponds to the transfer function property of a binary-to-duobinary converter;   |
| 17 | and   |
| 18 | after providing the final binary data signal, no duobinary data signal exists in the                        |
| 19 | transmitter subsystem.  |
| 1  | 48. (new) The invention of claim 47, wherein the at least one filter is adapted to filter after             |
| 2  | the final binary data signal is provided and prior to the received data signal being processed as the       |
| 3  | duobinary data signal.  |
| 1  | 49. (new) The invention of claim 48, wherein the at least one filter is designed to emphasize               |
| 2  | high-frequency components and flatten group delay of the electrical backplane.                              |
| 1  | 50. (new) The invention of claim 48, wherein the at least one filter comprises:                             |
| 2  | one or more delays adapted to delay a first copy of the filtered data signal;                               |
| 3  | an attenuator adapted to attenuate the delayed first copy; and  |
| 4  | a summing node adapted to add the attenuated, delayed first copy to a second copy of the filtered           |
| 5  | data signal.  |
| 1  | 51. (new) The invention of claim 50, wherein the at least one filter further comprises a                    |
| 2  | selector connected to receive an output from each of a plurality of delays and adapted to select one of the |
| 3  | delay outputs as the signal applied to the attenuator.  |
| 1  | 52. (new) The invention of claim 48, wherein the combination of the at least one filter and                 |
| 2  | the electrical backplane approximates a binary-to-duobinary converter.                                      |
| 1  | 53. (new) The invention of claim 47, wherein the receiver subsystem comprises a                             |
| 2  | duobinary-to-binary (D/B) converter adapted to apply duobinary-to-binary conversion to the received         |
| 3  | data signal to generate an output binary data signal.   |
| 1  | 54. (new) The invention of claim 53, wherein the D/B converter comprises:                                   |

Serial No. 10/727,450 -5- Adamiecki 3-7 (990.0517)

a splitter adapted to split the received data signal;

2

| 3 | two comparators, each adapted to compare a copy of the received data signal to a specified               |
|---|--|
| 4 | threshold voltage; and   |
| 5 | a logic gate adapted to generate the output binary data signal from outputs from the two                 |
| 6 | comparators.   |
| 1 | 55. (new) The invention of claim 54, wherein:  |
| 2 | the output binary data signal is an NRZ binary data signal; and  |
| 3 | the threshold voltages for the two comparators are selected such that one of the comparator              |
| 4 | outputs is always zero or always one.  |
| 1 | 56. (new) The invention of claim 47, wherein:  |
| 2 | the transmitter subsystem comprises a precoder adapted to provide the final binary data signal as        |
| 3 | a precoded binary data signal;   |
| 4 | the at least one filter is adapted to perform filtering after the final binary data signal is provided   |
| 5 | and prior to the received data signal being processed as the duobinary data signal; and                  |
| 6 | the receiver subsystem comprises a duobinary-to-binary converter adapted to apply duobinary-to-          |
| 7 | binary conversion to the received data signal to generate an output binary data signal.                  |
| 1 | 57. (new) The invention of claim 56, wherein:  |
| 2 | the combination of the at least one filter and the electrical backplane approximates a binary-to-        |
| 3 | duobinary converter; and   |
| 4 | the duobinary-to-binary converter comprises:   |
| 5 | a splitter adapted to split the received data signal;  |
| 6 | two comparators, each adapted to compare a copy of the received data signal to a                         |
| 7 | specified threshold voltage; and   |
| 8 | a logic gate adapted to generate the output binary data signal from outputs from the two                 |
| 9 | comparators.   |
| 1 | 58. (new) Apparatus for processing signals in a transmission system having a transmitter                 |
| 2 | subsystem connected to a receiver subsystem by an electrical backplane, wherein the electrical backplane |
| 3 | receives a transmitted data signal from the transmitter subsystem and provides a received data signal to |
| 4 | the receiver subsystem, the apparatus comprising:  |
| 5 | in the transmitter subsystem:  |
| 6 | means for providing a final binary data signal; and  |

| 7  | means for processing the final binary data signal to provide the transmitted data signal to               |
|----|---|
| 8  | the electrical backplane; and   |
| 9  | in the receiver subsystem:  |
| 10 | means for receiving the received data signal from the electrical backplane; and                           |
| 11 | means for processing the received data signal as a duobinary data signal, wherein:                        |
| 12 | the transmission system comprises at least one filter located in at least one of the                      |
| 13 | transmitter subsystem and the receiver subsystem;   |
| 14 | the transfer function property of the combination of the electrical backplane and                         |
| 15 | the at least one filter corresponds to the transfer function property of a binary-to-duobinary converter; |
| 16 | and   |
| 17 | after providing the final binary data signal, no duobinary data signal exists in the                      |
| 18 | transmitter subsystem.  |

Serial No. 10/727,450 -7- Adamiecki 3-7 (990.0517)